

IN THE CLAIMS

Please amend the claims as follows:

Claims 1-4 (Canceled).

Claim 5 (Previously Presented): A method according to claim 67 wherein $\alpha = (\alpha' + \text{offset})$

where $\alpha' + \text{offset}$ is a function of the data bit to be embedded in the coefficient,
 $\alpha' = 0$ if S is positive and the data to be embedded is a symbol of a first value,
 $\alpha' = 0$ if S is negative and the data to be embedded is a symbol of a second value, and
otherwise α' is a function of S such that $\sum C_i' P_i$ has the correct sign to represent the
symbol to be embedded.

Claim 6 (Original): A method according to claim 5, wherein
the first value is "1" and the second value is "0".

Claim 7 (Previously Presented): A method according to claim 5, wherein the said
function of S is $\alpha' = -S/(L-1)$ or $\alpha' = -S/L$.

Claim 8 (Previously Presented): A method according to claim 5, wherein the
magnitude of the offset is greater than or equal to zero.

Claim 9 (Original): A method according to claim 8, wherein
the magnitude of the offset is one.

Claim 10 (Previously Presented): A method according to claim 67, wherein

said coefficients are coefficients of a wavelet transform of the information signal.

Claim 11 (Previously Presented): A method according to claim 67, wherein the data to be embedded includes a Unique Material Identifier (UMID).

Claim 12 (Previously Presented): A method of removing data from an information signal representing material, which data has been embedded by the method of claim 67, the method comprising the steps of:

calculating the correlation $S' = E C_i' * P_i$ for $i=1$ to L , where P_i are the bits of the Pseudo Random Symbol Sequence (PRSS) and have values $+1$ and -1 ;

calculating α_i as a function of S' ; and

calculating $C_i = C_i' - \alpha_i \cdot P_i$ to recover the unmodified coefficients C_i .

Claim 13 (Original): A method according to claim 12, wherein

$\alpha_i = S'/(L-1)$ or $\alpha_i = (S'/L)$.

Claim 14 (Previously Presented): A method according to claim 12, further comprising the step of:

deriving the symbols of the embedded data from S' , where if S' is positive a symbol is of the first value and if S' is negative a symbol is of the second value.

Claim 15 (Previously Presented): A method according to claim 12, further comprising the step of:

generating and synchronizing a reference pseudo random symbol sequence with the pseudo random symbol sequence of the embedded data.

Claim 16 (Previously Presented): A computer program product embodied in a computer readable medium arranged to carry out the method of claim 67, when run on a computer.

Claims 17-20 (Canceled).

Claim 21 (Previously Presented): Apparatus according to claim 68 wherein

$$\alpha = (\alpha' + \text{offset})$$

where $\alpha' + \text{offset}$ is a function of the data bit to be embedded in the coefficient, and the apparatus is arranged to

calculate modified coefficient values $C_i' = C_i + (\alpha' + \text{offset}) \cdot P_i$ where

$\alpha' = 0$ if S is positive and the data to be embedded is a bit of a first value,

$\alpha' = 0$ if S is negative and the data to be embedded is a bit of a second value, and

otherwise α' is a function of S such that $\sum C_i' \cdot P_i$ has the correct sign to represent the bit to be embedded.

Claim 22 (Original): Apparatus according to claim 21, wherein

the first value is "1" and the second value is "0".

Claim 23 (Original): Apparatus according to claim 21, wherein

$$\alpha = -S/(L-1) \text{ or } -S/L.$$

Claim 24 (Previously Presented): Apparatus according to claim 21, wherein

the offset is greater than or equal to zero.

Claim 25 (Previously Presented): Apparatus according to claim 24 wherein the offset
= 1.

Claim 26 (Previously Presented): Apparatus according to claim 68, wherein
the coefficients are coefficients of a wavelet transform of the material information
signal.

Claim 27 (Previously Presented): Apparatus according to claim 68, further
comprising:

a generator for generating a Unique Material Identifier (UMID) as said data to be
embedded.

Claim 28 (Previously Presented): Apparatus for removing data from an information
signal representing material, which data has been embedded by the apparatus of claim 68, the
apparatus comprising:

a generator for generating a Pseudo Random Symbol Sequence (PRSS); and

a calculator for calculating,

the correlation $S' = \sum C_i' \cdot P_i$ for $i = 1$ to L where P_i are the bits of the PRSS,

a value α_r , dependent on S' , and

a coefficient value $C_i = C_i' - \alpha_r \cdot P_i$ to recover the unmodified coefficients C_i .

Claim 29 (Original): Apparatus according to claim 26, wherein $\alpha_r = S/(L-1)$ or (S/L) .

Claim 30 (Previously Presented): Apparatus according to claim 28, further comprising:

a decoder for deriving the bits of the embedded data from the correlation value S' , where if S' is positive a bit of the data has a first value and if S' is negative a bit of the data has a second value.

Claim 31 (Previously Presented): Apparatus according to claim 28, further comprising

a synchronizer for synchronizing the generated PRSS Pseudo Random Symbol Sequence (PRSS) with the PRSS of the embedded data.

Claim 32 (Currently Amended): A method of embedding data in an information signal representing material, said method comprising the steps of:

producing transform coefficients C_i of the material;

comparing the magnitudes of the coefficients with a threshold value T ; and

~~producing, from the coefficients C_i and the said data, modified coefficient values C_i' which are modified by respective information symbols of a pseudo random symbol sequence modulated by the said data to be embedded;~~

producing modified coefficient value C_i' by adding an additive offset to the coefficient C_i , wherein said offset is an information symbol of a pseudo random symbol sequence modulated by said data to be embedded;

wherein said step of producing modified coefficient values does not use coefficients of magnitude greater than the said threshold T and does not use the corresponding information symbols of the pseudo random symbol sequence, the value of said threshold T being set to reduce a likelihood of any coefficient having a dominant effect on a correlation

of the pseudo random symbol sequence and the information signal in which the data has been embedded.

Claim 33 (Original): A method according to claim 32, wherein

the modified coefficients $C_i' = C_i + \alpha \cdot P_i$

where $\alpha \cdot P_i$ is an information symbol modulated by the data to be embedded, α being a scaling factor.

Claim 34 (Original): A method according to claim 33, wherein

α is dependent on the data.

Claim 35 (Original): A method according to claim 33, wherein

α is of fixed value.

Claim 36 (Original): A method according to claim 32, wherein

the modified coefficients $C_i' = C_i + \alpha \cdot R_i$

where R_i is an information symbol P_i modulated by the data, and α is a scaling factor.

Claim 37 (Previously Presented): A method according to claim 32, wherein

said transform is a wavelet transform.

Claim 38 (Previously Presented): A method according to claim 32, wherein

said transform is a spatial frequency transform.

Claim 39 (Previously Presented): A method for detecting data embedded in an information signal representing material, the detecting method comprising:

receiving transform coefficients of the information signal;
comparing the magnitudes of the received coefficients with a threshold value T ; and
correlating, said coefficients with respective symbols of a pseudo random symbol sequence to detect said data,

wherein the correlating step does not use coefficients of magnitude greater than said threshold T and corresponding symbols of the pseudo random symbol sequence.

Claim 40 (Previously Presented): A method according to claim 39, further comprising the step of:

removing said data from said received coefficients not using coefficients of magnitude greater than said threshold T .

Claim 41 (Previously Presented): A method of detecting data embedded in an information signal representing material, the method comprising the steps of:

receiving transform coefficients of the information signal;
comparing the magnitudes of the received coefficients with a threshold T_{clip} ;
clipping, to a magnitude T_{clip} , the magnitude of coefficients of magnitude greater than said threshold T_{clip} ; and

correlating the clipped and unclipped coefficients with a pseudo random symbol sequence to detect data embedded in the information signal.

Claim 42 (Previously Presented): A method according to claim 41, further comprising the step of:

composing removing data from said clipped and unclipped coefficients.

Claim 43 (Previously Presented): A method of embedding data in an information signal representing material, said method comprising the steps of:

producing transform coefficients C_i of the material;

comparing the magnitudes of the coefficients with a threshold value T ; and

producing, from the coefficients C_i and the said data, modified coefficient values C_i' which are modified by respective information symbols of a pseudo random symbol sequence modulated by the said data to be embedded;

wherein the said step of producing modified coefficient values does not use coefficients of magnitude greater than the said threshold T and does not use the corresponding information symbols; and detecting the data by

receiving transform coefficients of the material;

comparing the magnitudes of the received coefficients with a threshold T_{clip} ;

clipping, to a magnitude T_{clip} , the magnitude of coefficients of magnitude greater than the said threshold T_{clip} ; and

correlating the clipped and unclipped coefficients with a pseudo random symbol sequence to detect data embedded in the material.

Claim 44 (Canceled).

Claim 45 (Previously Presented): A computer program product embodied in a computer readable medium arranged to carry out the method of 32, when run on a computer.

Claim 46 (Currently Amended): Apparatus for embedding data in an information signal representing material, said apparatus comprising:

a transformer for producing transform coefficients C_i of the information signal;

a comparator for comparing the magnitudes of the coefficients with a threshold value T ; and

~~a combiner for producing, from the coefficients C_i and said data, modified coefficient values C_i' which are modified by respective information symbols of a pseudo-random symbol sequence modulated by said data to be embedded;~~

a combiner for producing modified coefficient value C_i' by adding an additive offset to the coefficient C_i , wherein said offset is an information symbol of a pseudo random symbol sequence modulated by said data to be embedded;

wherein the combiner does not use coefficients of magnitude greater than said threshold T and does not use the corresponding information symbols of the pseudo random symbol sequence, the value of said threshold T being set to reduce a likelihood of any coefficient having a dominant effect on the correlation of the pseudo random symbol sequence and the information signal in which the data has been embedded.

Claim 47 (Original): Apparatus according to claim 46, wherein

the combiner is arranged to produce modified coefficients $C_i' = C_i + \alpha P_i$

where αP_i is an information symbol modulated by the data to be embedded, α being a scaling factor.

Claim 48 (Original): Apparatus according to claim 47, wherein

α is dependent on the data.

Claim 49 (Original): Apparatus according to claim 47, wherein
 α is of fixed value.

Claim 50 (Original): Apparatus according to claim 46, wherein
the combiner is arranged to produce coefficients $C_i' = C_i + \alpha R_i$
where R_i is an information symbol P_i modulated by the data, and α is a scaling factor.

Claim 51 (Previously Presented): Apparatus according to claim 50, said apparatus
further comprising:

a pseudo random sequence generator and a modulator for modulating the pseudo
random sequence with said data.

Claim 52 (Previously Presented): Apparatus according to claim 46, wherein
said transformer is a wavelet transformer.

Claim 53 (Previously Presented): Apparatus according to claim 46, wherein
the said transformer produces a spatial frequency transform of said information signal.

Claim 54 (Previously Presented): Apparatus for detecting data embedded in an
information signal representing material, the detecting apparatus comprising:

an input for receiving transform coefficients of an information signal;
a comparator for comparing the magnitudes of the received coefficients with a
threshold T ; and
a correlator for correlating said coefficients with respective symbols of a pseudo
random symbol sequence to detect said data,

wherein the correlation does not use coefficients of magnitude greater than the said threshold T and the corresponding symbols of the pseudo random symbol sequence.

Claim 55 (Previously Presented): Apparatus according to claim 54, further comprising:

a data remover for removing data from the receiving coefficients, the remover omitting coefficients of magnitude greater than said threshold T.

Claim 56 (Previously Presented): Apparatus for detecting data embedded in an information signal representing material, said apparatus comprising:

an input for receiving transform coefficients C_i of the information signal;

a comparator for comparing the magnitudes of the received coefficients with a threshold T_{clip} ;

a clipper for clipping, to a magnitude T_{clip} , the magnitude of coefficients of magnitude greater than said threshold T; and

a correlator for correlating the clipped and unclipped coefficients with a pseudo random symbol sequence to detect data embedded in the information signal.

Claim 57 (Previously Presented): Apparatus according to claim 56, further comprising:

a remover for removing data from the clipped and unclipped coefficients.

Claim 58 (Canceled).

Claim 59 (Previously Presented): A system including an embedding apparatus, said system comprising:

a transformer for producing transform coefficients C_i of an information signal representing material,

a comparator for comparing the magnitudes of the coefficients with a threshold value T , and

a combiner for producing, from the coefficients C_i and the said data, modified coefficient values C_i' which are modified by respective information symbols of a pseudo random symbol sequence modulated by the said data to be embedded, wherein the combiner does not use coefficients of magnitude greater than the said threshold T and does not use the corresponding information symbols; and detecting apparatus comprising:

an input for receiving transform coefficients of the material;

a comparator for comparing the magnitudes of the received coefficients with a threshold T ; and

a correlator for correlating the said coefficients with respective symbols of a pseudo random symbol sequence to detect the said data, wherein the correlation does not use coefficients of magnitude greater than the said threshold T and the corresponding symbols of the pseudo random symbol sequence.

Claim 60 (Previously Presented): A method according to claim 32, wherein said data comprises a Unique Material Identifier.

Claim 61 (Previously Presented): A method according to claim 32, wherein said material comprises video material.

Claim 62 (Previously Presented): A method according to claim 32, wherein said material comprises audio material.

Claim 63 (Previously Presented): A computer program product embodied in a computer readable medium arranged to carry out the method of claim 67 when run on a computer.

Claim 64 (Currently Amended): A computer program product embodied in a computer readable medium arranged to carry out the method of claim 39 when run on a computer.

Claim 65 (Previously Presented): A computer program product embodied in a computer readable medium arranged to carry out the method of claim 41 when run on a computer.

Claim 66 (Canceled).

Claim 67 (Previously Presented): A method of embedding data in an information signal representing material, the method comprising the steps of:

producing transform coefficients C_i representing a transform of the information signal;

producing a pseudo random symbol stream having L symbols P_i , the pseudo random symbol stream comprising symbol values of +1 or -1;

calculating a correlation value $S = \sum C_i * P_i$ for $i = 1$ to L ; and

calculating modified coefficient values $C_i' = C_i + \alpha * P_i$, where α is calculated dependent on the value of S being positive or negative to identify a corresponding binary value of the data symbol being embedded.

Claim 68 (Previously Presented): An apparatus for embedding data in an information signal representing material, the apparatus comprising:

a transformer for producing transform coefficients C_i representing a transform of the information signal;

a generator for producing a pseudo random symbol stream having L symbols P_i , the pseudo random symbol stream comprising symbol values of +1 or -1;

an input for receiving symbols of the data to be embedded; and

a data embedder arranged to calculate a correlation value $S = \sum C_i * P_i$ for $i = 1$ to L;

and

to calculate modified coefficient values $C_i' = C_i + \alpha * P_i$, where α is calculated dependent on the value of S being positive or negative to identify a corresponding binary value of the data symbol being embedded.